CLAIMS

1. An extruder screw nose for a discharge end of an extruder having a screw with at least two helical flights rotatable in a cylindrical barrel for propelling an extrudate material from an upstream portion of said barrel to a downstream portion characterized by said screw nose having an upstream portion of increasing diameter in the direction of flow of said extrudate providing a generally conical surface for decreasing a transition space between said screw nose and said barrel and maintaining working engagement with said extrudate to maintain pressure on said extrudate at said discharge end.

2. The extruder screw nose according to claim 1 further characterized by having a downstream portion of decreasing diameter in said direction of flow providing a generally conical surface generally parallel to a converging tapered wall of an adjacent flow channel block for maintaining working engagement with the extrudate and maintaining the pressure on the extrudate at said discharge end.

3. The extruder screw nose according to claim 1 further characterized by said upstream portion of increasing diameter having a conical surface disposed at an angle of 45 degrees to 65 degrees relative to the axis of said screw nose.

4. The extruder screw nose of claim 3 further characterized by said angle of said conical surface of said upstream portion being about 50 degrees.

5. The extruder screw nose according to claim 2 further characterized by said generally conical surface of said downstream portion being at an angle of 35 degrees to 45 degrees relative to the axis of said screw nose.

6. The extruder screw nose of claim 5 further characterized by said angle of said generally conical surface of said downstream portion being at an angle of about 40 degrees.

7. A method of extruding a shaped visco-elastic component, comprising:

(a) feeding a visco-elastic material into a cylindrical extruder barrel at a feed end of said extruder,

(b) rotating a screw to mix and provide working engagement of said screw with said cylindrical extruder barrel characterized by,

(c) maintaining working engagement of said screw and said extruder barrel at a discharge end of said extruder by confining the flow of said visco-elastic material through a transition space between a screw nose on said screw and said cylindrical extruder barrel

wherein said screw nose has an upstream portion of increasing diameter in the direction of flow of said material providing an upstream generally conical surface.

8. The method of claim 7 further comprising maintaining working engagement of said visco-elastic material from said upstream portion to a downstream portion of decreasing diameter in said transition space wherein a flow channel head with a tapered wall is attached to said extruder characterized by conveying said visco-elastic material in working engagement with said downstream portion of said screw nose and said tapered wall of said flow channel head.

9. An extruder and flow channel head assembly comprising an extruder having a cylindrical barrel with a feed end and a discharge end, said discharge end being attached to a flow channel head containing a flow channel for carrying rubber from said extruder to a suitable die, a screw nose on said extruder screw positioned in a transition space at said discharge end of said barrel characterized by said screw nose having a radially expanding upstream portion providing a conical surface of increasing diameter in the direction of flow of said rubber for maintaining said rubber in working engagement with said screw nose and said cylinder wall, whereby the pressure on said rubber is maintained in said transition space.

10. An extruder and flow head assembly according to claim 9, further characterized by said screw nose having a downstream portion with a conical surface of decreasing diameter in the direction of flow of said rubber spaced from an opposing tapered wall of said flow channel head to maintain working engagement of said rubber with said conical surface of said screw nose and said tapered wall of said flow channel head whereby pressure on said rubber is maintained to prevent expansion of volatiles in said rubber.

11. An extruder and flow head assembly according to claim 10, further characterized by said flow channel having a generally constant cross sectional area from said tapered wall of said flow channel head to a discharge end of said flow channel head to maintain pressure on said rubber and provide time for volatiles in said material to be dissolved before ejection from said flow channel head.

## AMENDED CLAIMS

[received by the International Bureau on 9 November 1999 (09.11.99);
original claims 1-11 replaced by amended claims;
1-11 (2 pages)]

1. An extruder having a screw with at least two helical flights rotatable in a cylindrical barrel for propelling an extrudate material from an upstream portion and an extruder screw nose at a discharge end of said extruder of said barrel to a downstream portion characterized by said screw nose having an upstream portion of increasing diameter in the direction of flow of said extrudate providing a generally conical surface for decreasing a transition space between said screw nose and said cylindrical barrel and maintaining working engagement with said extrudate to maintain pressure on said extrudate at said discharge end.

2. The extruder according to claim 1 further characterized by said screw nose having a downstream portion of decreasing diameter in said direction of flow providing a generally conical surface generally parallel to a converging tapered wall of an adjacent flow channel block for maintaining working engagement with the extrudate and maintaining the pressure on the extrudate at said discharge end.

3. An extruder screw nose for a discharge end of an extruder having a screw with at least two helical flights rotatable in a cylindrical barrel for propelling an extrudate material from an upstream portion of said barrel to a downstream portion of said barrel characterized by said screw nose having an upstream portion of increasing diameter in the direction of the flow of said extrudate providing a generally conical surface disposed at an angle of 45 degrees to 65 degrees relative to the axis of the screw nose and a downstream portion of decreasing diameter in said direction of flow providing a generally conical surface generally parallel to a converging tapered wall of an adjacent flow channel block.

4. The extruder screw nose of claim 3 further characterized by said angle of said conical surface of said upstream portion being about 50 degrees.

5. The extruder screw nose according to claim 3 further characterized by said generally conical surface of said downstream portion being at an angle of 35 degrees to 45 degrees relative to the axis of said screw nose.

6. The extruder screw nose of claim 5 further characterized by said angle of said generally conical surface of said downstream portion being at an angle of about 40 degrees.

7. A method of extruding a shaped visco-elastic component, comprising:

(a) feeding a visco-elastic material into a cylindrical extruder barrel at a feed end of said extruder,

(b) rotating a screw to mix and provide working engagement of said screw with said cylindrical extruder barrel characterized by,

(c) maintaining working engagement of said screw and said extruder barrel at a discharge end of said extruder by confining the flow of said visco-elastic material through a transition space between a screw nose on said screw and said cylindrical extruder barrel wherein said screw nose has an upstream portion of increasing diameter in the direction of flow of said material to a diameter not greater than the diameter of said cylindrical extruder barrel providing an upstream generally conical surface.

8. The method of claim 7 further comprising maintaining working engagement of said visco-elastic material from said upstream portion to a downstream portion of decreasing diameter in said transition space wherein a flow channel head with a tapered wall is attached to said extruder characterized by conveying said visco-elastic material in working engagement with said downstream portion of said screw nose and said tapered wall of said flow channel head.

9. An extruder and flow channel head assembly comprising an extruder having a screw and cylindrical barrel with a screw flight extending from a feed end to a discharge end, said discharge end being attached to a flow channel head containing a flow channel for carrying rubber from said extruder to a suitable die, a screw nose on said extruder screw positioned at the end of said screw flight in a transition space at said discharge end of said barrel characterized by said screw nose having a radially expanding upstream portion providing a conical surface of increasing diameter in the direction of flow of said rubber for maintaining said rubber in working engagement with said screw nose and said cylinder wall, whereby the pressure on said rubber is maintained in said transition space.

10. An extruder and flow head assembly according to claim 9, further characterized by said screw nose having a downstream portion with a conical surface of decreasing diameter in the direction of flow of said rubber spaced from an opposing tapered wall of said flow channel head to maintain working engagement of said rubber with said conical surface of said screw nose and said tapered wall of said flow channel head whereby pressure on said rubber is maintained to prevent expansion of volatiles in said rubber.

11. An extruder and flow head assembly according to claim 10, further characterized by said flow channel having a generally constant cross sectional area from said tapered wall of said flow channel head to a discharge end of said flow channel head to maintain pressure on said rubber and provide time for volatiles in said rubber to be dissolved before ejection from said flow channel head.